

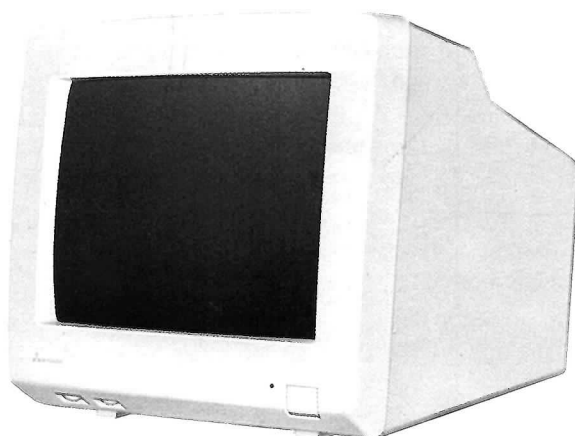


MITSUBISHI

JUNE, 1988

Service Manual

COLOR MONITOR



MODEL
AUM-1381A

CAUTION

Before servicing this product, it is important that the serviceman reads the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" in this service manual.

SPECIFICATIONS

- **Picture tube** 13" viewable, 90 degree deflection
0.31 mm trio dot pitch
Super high contrast glass, Non-glare
P22, Medium-short persistence
High voltage: 22.5kV (at 0mA)
- **Video**
 - Band width** 30 MHz
 - Resolution** Mode 1. RGB TTL/ANALOG
800 dots Horizontal
560 lines Vertical
Mode 2. Composite Video
500 dots Horizontal
350 line Vertical
- **Input Signal** Comp. video: NTSC
RGB: video: TTL Positive 8/16/64
Colors
Analog 0.6 Vp-p positive
Sync.: Separate sync. TTL \pm HD, \pm VD
Comp. sync. TTL \pm HD/VD
Comp. sync. on green video
- **Connector** BNC Jack
D-Sub 9-pin
D-Sub 25-pin
- **Synchronization** Horizontal: 15.6 kHz to 36 kHz
(Automatically)
Vertical: 45 Hz to 90 Hz
(Automatically)
- **Power Input** NTSC.... AC 120 V 60 Hz
- **Power Consumption** 85 watts
- **Dimension** 362 mm(W) \times 328 mm(H) \times 383 mm(D)
14-1/4" \times 12-29/32" \times 15-5/64"
- **Unit Net Weight** 14.5 kg (32.0 lbs)
- **Special Features**
 - * Automatic tracking of wide rang horizontal and vertical scanning frequencies.
f(H): 15.6 ~ 36 kHz
f(V): 45 ~ 90 Hz
 - * Size and position of the screen can be adjusted with external controls.
 - * High-resolution color CRT, 0.31mm trio dot pitch, diamond matte coating super-high Contrast glass.
 - * Supports wide variety of input signals such as, video composite, RGBI TTL, RGB analog and TTL monochrome.
 - * Diverse displays are obtainable by inputs of various signals such as composite video, RGB TTL, analog and monochrome.

MITSUBISHI ELECTRIC CORPORATION

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SAFETY PRECAUTIONS

NOTICE. Observe all cautions and safety related notes located inside the color monitor cabinet and on the color monitor chassis.

WARNING

1. Operation of this color monitor, outside the cabinet or with the cover removed, involves a shock hazard from the color monitor power supplies. Work on the color monitor should not be attempted by anyone who is not thoroughly familiar with precautions necessary when working on high-voltage equipment.
2. Do not install, remove or handle the picture tube in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.

X-RADIATION WARNING

The surface of the picture tube may generate X-Radiation. Precaution during service and, if possible, the use of a lead apron is recommended for shielding while handling.

When replacing the picture tube, use only the designated replacement part since it is a critical component with regard to X-Radiation as noted above. (No high-voltage adjustments are provided.) The high-voltage specification is described on page 1.

LEAKAGE CURRENT CHECK

Before returning the color monitor to the customer, it is recommended that leakage current be measured according to the following methods.

1. Cold Check

With the AC plug removed from the Power source, place a jumper across the two AC plug prongs. Turn the color monitor AC switch on. Using an ohm-meter, connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (screwheads, metal overlays, control shafts, etc.) particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistance reading of 1 megohm. Any resistance below this value indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

2. Hot Check

The test sequence, with reference to the measuring circuit in Fig.1, is as follows:

- (1) With switch S1 open, the color monitor is to be connected to the measuring circuit. Immediately after connection, the leakage current is measured using both positions of switch S2, and with the switching devices in the color monitor in all of their operating positions.
 - (2) Switch S1 is then to be closed, energizing the color monitor, and immediately after closing the switch, the leakage current is to be measured using both positions of switch S2, and with the switching devices in the color monitor in all of their operating positions.
- Current measurements of items (1) and (2) are to be repeated after the color monitor has reached thermal stabilization.

The leakage current shall not be more than 3.5mA.

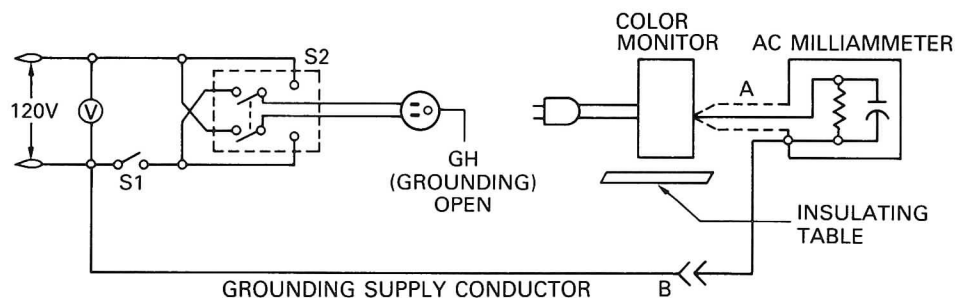


Fig. 1

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in color monitor have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this service manual. Electrical components having such features are identified by shading on the schematic diagram and the parts list of this service manual and by marking on the supplementary sheet for this chassis to be issued subsequently. Therefore replacements for any safety parts should be identical in value and characteristics.

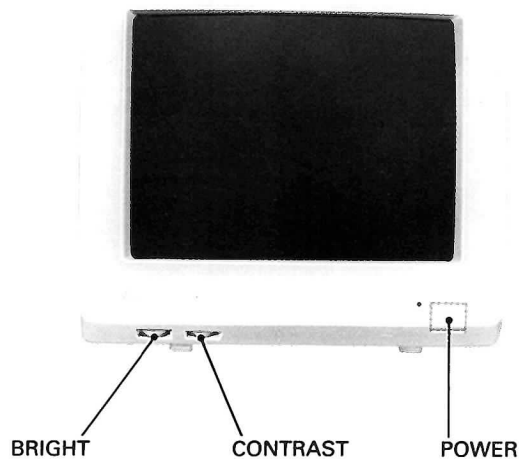


Fig. 2 Controls

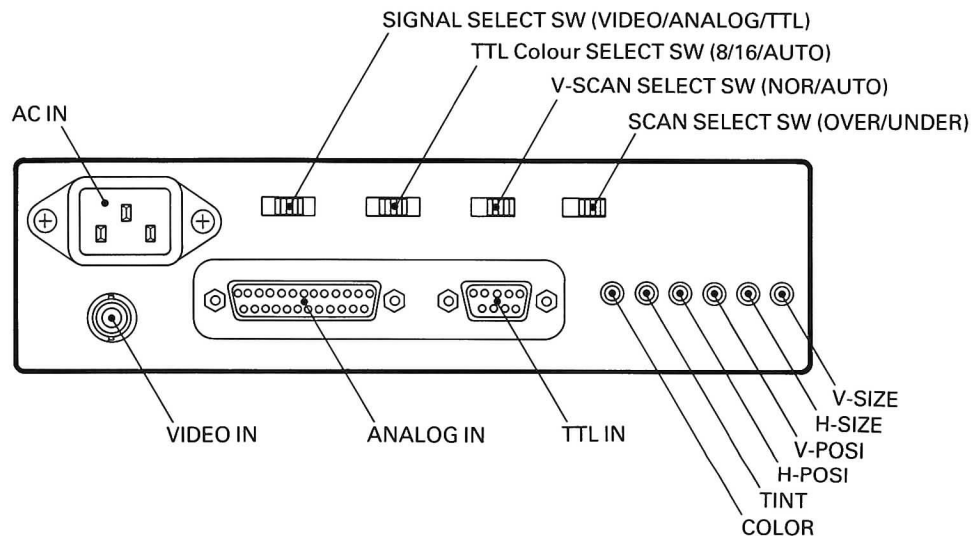


Fig. 3 Terminals

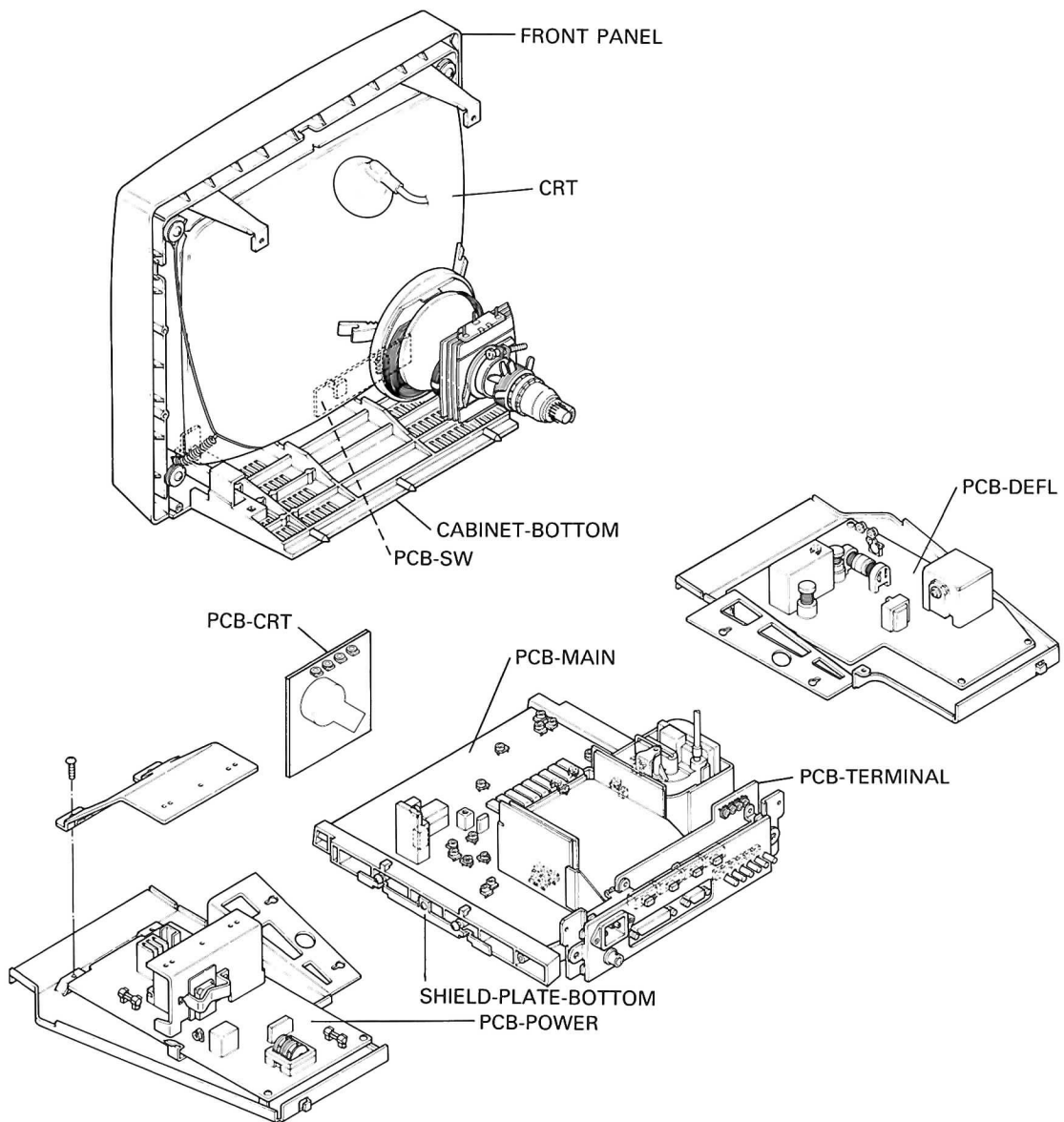


Fig. 4

Disassembly

1. Place the monitor on a table with the face facing downward.
Caution: Cover the surface of the table with a cushion, blanket, or else so that the face shall not be scored.
2. Remove the back cover by unscrewing six screws.
(2 screws at the top of the back cover, two screws at two sides of the rear panel, and 2 screws on two sides at the bottom of the back cover)
3. Set the monitor upright on the table.
4. Remove the SHIELD-PLATE-TOP by unscrewing six screws.
Remove the SHIELD-PLATE-REAR by slightly lifting upwards after removing four fastening screws.
5. Place a plate with a thickness of about 10 mm below the CABINET-BOTTOM for floating the rear of the monitor.
Caution: If the bracket fastening screws are removed without floating the rear of the cabinet, an excess force may act on the CRT PCB and the CRT, damaging them.
6. Remove two screws which fastening the bracket to the front panel on each side, and draw out the entire chassis to the operator side.
Caution: Pull the chassis by paying attention to the wires and other parts.
7. Remove two screws from the two sides of the SHIELD-PLATE-TERMINAL.
Loosen two screws fastening the bracket-POWER to the chassis. Raise the bracket slightly and turn it down to the left side.
8. Remove one screw which fastens the right bracket-DEFL to the flyback-trans, and turn down to the right side as in the above para. 7.
9. To check the rear side of the PCB-MAIN, loosen two screws fastening the SHIELD-PLATE-BOTTOM.

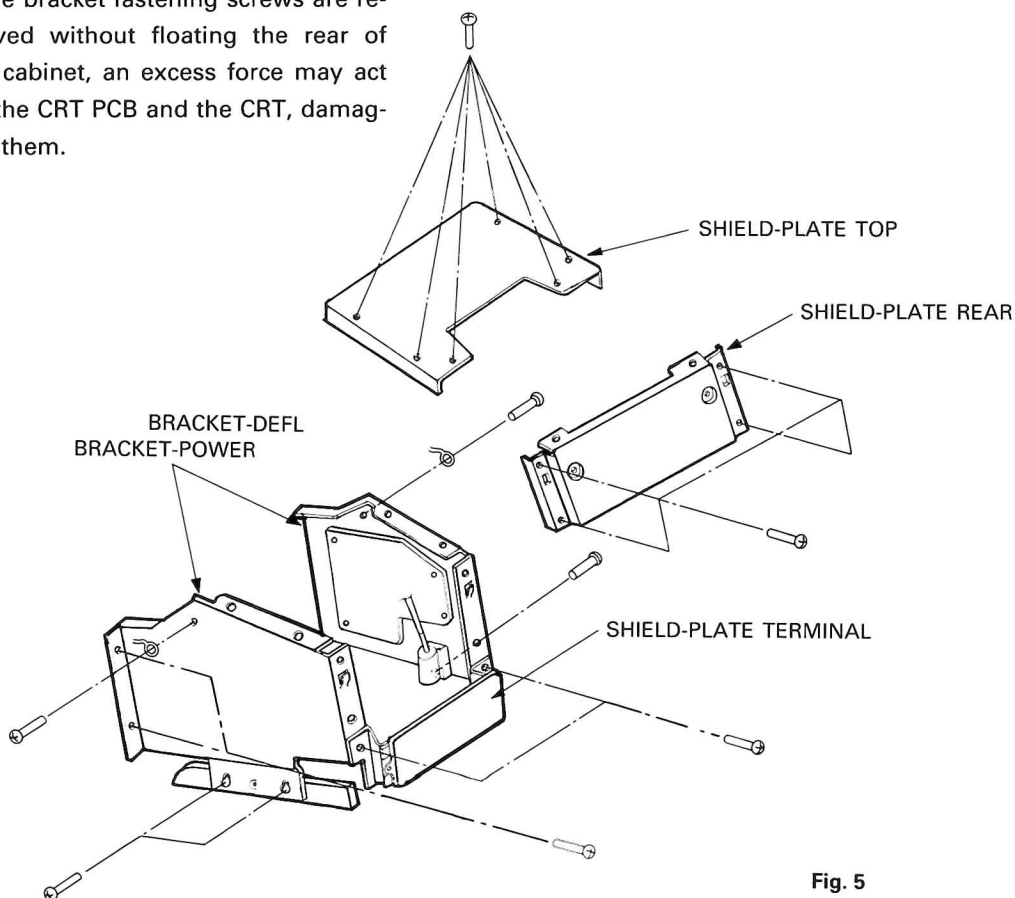
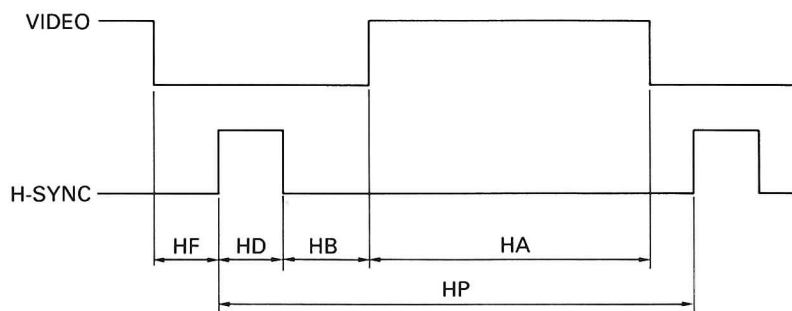


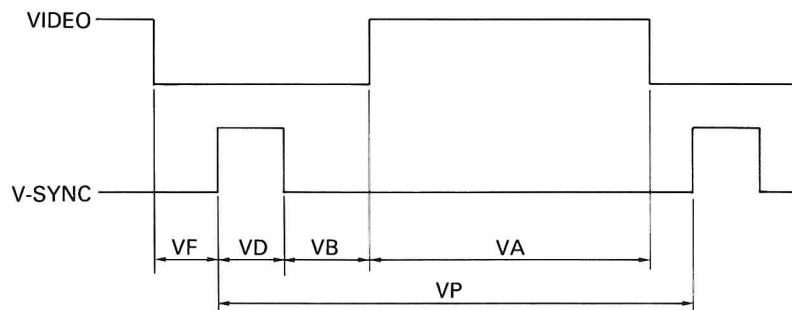
Fig. 5

TIMING CHART

HORIZONTAL



VERTICAL



MODE		Horizontal Timing					Vertical Timing					Unit	f _H (kHz)	f _V (Hz)	Note	
		HP	HF	HD	HB	HA	VP	VF	VD	VB	VA					
M1-2		63.78	6.47	4.45	8.03	44.83	16680	1640	190	2110	12740	μS	15.7	60	CGA	
M2-1		45.75	−0.14	4.924	1.65	39.62	16750	44	595	100	16011	μS	21.8	59.7	EGA	
M3-1		54.34	0.348	8.29	1.49	44.212	20040	51	868	133	18990	μS	18.4	50	MDA	
M4-1		32	0.64	5.12	0.64	25.6	16670	384	512	418	15356	μS	31.25	60		
M5-1		32.7	0.2	4.48	2.36	25.66	16650	97	65	816	15672	μS	30.5	60	PGA Mode control "H" 480 lines	
M5-2		32.7	0.2	4.48	2.36	25.66	16650	1400	65	2120	13065	μS	30.5	60	PGA Mode control "L" 400 lines	
M6-1		NTSC											15.734	60		
M6-2		PAL											15.625	50		
M7-1		40.28	3.04	3.04	3.80	30.40	18040	280	320	1330	16110	μS	24.83	55.4	PC-9801	
M7-2		41.04	3.04	3.04	4.56	30.40	18050	330	330	990	16420	μS	24.366	55.4	FM-11	
M8-1		32.40	1.80	3.00	3.60	24.00	16653.6	64.8	64.8	777.6	15796.4	μS	30.86	60	MULTI-16III Non-Interlaced	
M9-1	HD	VD	31.778	0.636	3.813	1.907	25.42	(525H)	(11H)	(2H)	(32H)	(480H)	(H)	31.468	60	PS/2 480 Line
	−	−						16683.5	349.5	63.56	1016.9	15253.4	μS			
M9-2	−	+	↑	↑	↑	↑	↑	(449H) 14268.3	(13H) 413.1	(2H) 63.56	(34H) 1080.4	(400H) 12711.2	(H) μS	↑	70	PS/2 400 Line
M9-3	+	−	↑	↑	↑	↑	↑	(449H) 14268.3	(38H) 1207.5	(2H) 63.56	(59H) 1874.9	(350H) 11122.3	(H) μS	↑	70	PS/2 350 Line
M9-4	+	+	28.15	0.18	3.92	1.25	22.8	408.5H	2H	2H	20.5H	384H	(H) μS	35.52	87	PS/2 768 Line Interlaced
M10-1		28.34	1.79	2.0	3.37	21.18	525H	3H	3H	39H	480H	(H) μS	35.28	67	APPLE MAC-II SYNC ON GREEN	
M11-1		30.45	2.34	1.76	2.93	23.41	410.5H	8.5H	5H	22H	375H	(H) μS	32.84	80	PC-98XL Interlaced	

★ CHECK AFTER ADJUSTMENT

Test of X-radiation protector circuit

- 1) Set INPUT SIGNAL SELECT SWITCH at the "VIDEO" position. Do not supply video signal.
- 2) Turn off the Power switch.
- 3) Connect a 180k Ω -J (R-composite 1/4W) resistor with R761 (FBT side) to GND.
- 4) Turn on the power switch.
- 5) Make sure that X-radiation protector has worked, namely, horizontal oscillation circuit has turned off.
- 6) Turn off the Power switch.
- 7) Remove the resistor (Item 3).

SERVICE ADJUSTMENT

[1] +B4 Voltage Adjustment

- 1) Receive a white pattern signal. <M2-1>
- 2) Set RGB-SUB-CONT control VR6X1 at the center position, CONTRAST control VR692 at maximum position and BRIGHT control VR691 at the click stop position.
- 3) Make sure the AC power supply voltage is at the specified value.
- 4) Set SERVICE SWITCH S201 on PCB RGB at the inside position picture tube side to obtain a horizontal line of low brightness across the screen.
- 5) Adjust CRT-BIAS (SCREEN) control VR592A until any of the red, blue or green horizontal line appear on the screen.
- 6) Return SERVICE SWITCH S201 at the center position.
- 7) Connect a DC voltmeter between the L-650 on the PCB-CRT and the chassis ground (-).
- 8) Adjust B4-ADJ control VR901 on the PCB-POWER for 172 \pm 2 V reading on the meter.

[2] Vertical Deflection Alignment <RGB>

- 1) Receive a cross-hatch signal. <M2-1>
- 2) Set V-POSI control on the rear panel so that the picture become center of raster and V-SIZE control so that vertical width becomes almost 184 mm.
- 3) Adjust V-LIN control VR402 for symmetry of vertical linearity.
- 4) Adjust V-SIZE control on the rear panel so that vertical width becomes 184 \pm 1.5 mm.

[3] Horizontal Deflection Alignment

- 1) Receive a RGB TTL signal. <M10-1>

Adjust FV-35K control VR7F4 for almost synchronization.

- 2) Receive a RGB TTL signal. <M1-2>

Adjust FV-15K control VR7F3 for almost synchronization.

- 3) Receive a composite signal. *composite*

Adjust LOW-LIMIT control VR7F5 for almost synchronization.

- 4) Receive a white pattern signal. <M2-1>

Adjust S-REG control VR771 for identity of horizontal width at CONTRAST maximum and minimum.

- 5) Set H-POSI control on the rear panel so that the picture become center of raster and H-SIZE control at minimum position.

- 6) Adjust UNDER-H-SIZE control VR5A3 so that horizontal width becomes 245 \pm 1 mm.

- 7) Receive a white pattern signal. <M1-2>

Adjust OVER-H-SIZE control VR5A4 so that horizontal width becomes 245 \pm 1 mm.

[4] RGB VIDEO Circuit

RGB TTL SIGNAL White adjustment.

- 1) Receive a RGB TTL signal. <M2-1>
- 2) Set INPUT SIGNAL SELECT SWITCH at the "TTL" position.
- 3) Set R, G, B-CUT-OFF control VR650, VR651, VR652 at full counterclockwise position. Set SUB-BRT control VR6X1 at mechanical center position.
- 4) Set G, B-DRIVE control VR6G0, VR6B0 at full clockwise position.
- 5) Set BRIGHT control VR691 at click stop position and CONTRAST control VR692 at maximum position.
- 6) Set SERVICE SWITCH S201 at the inside position (picture tube side).
- 7) Adjust CRT-SCREEN control until any of the red, blue or green horizontal line appear on the screen.
- 8) Adjust the CUT-OFF controls (VR650, VR651 or VR652) to produce a white horizontal line.
- 9) Return SERVICE SWITCH S201 at the outside position (CT connector side).

Adjust DRIVE control volume of two bright colors on the screen among G,B-DRIVE control VR6B0 and VR6R0 to obtain a pure peak white raster. (Signal: white pattern of TTL)

RGB Analog Signal White ADJUSTMENT

- 1) Set INPUT SIGNAL SELECT SWITCH at the "ANALOG" position.
- 2) Receive a RGB ANALOG signal. (a gray scale of 16 graduations.)
- 3) Adjust SUB-BRT control VR6X1 to optimum brightness.

Note: Check overall black and white tone through the normal brightness and contrast range.
If necessary, repeat steps from RGB TTL white adjust (6) to Analog white adjust (3).

RGB BEAM CURRENT ADJUSTMENT

- 1) Receive a TTL white raster (INTENSITY-"H") signal. <M2-1>
- 2) Connect a DC ammeter with 1 mA full scale between the test point TP1pin (+) and TP2pin (-) on PWB-MAIN.
- 3) Set BRIGHT control at click stop position, CONTRAST control at maximum position and H-SIZE control at minimum position.
- 4) Adjust SUB-CONT control VR6X0 for beam current of $530 \pm 20 \mu\text{A}$ on the meter.
- 5) Remove a DC ammeter.

Note: Re-adjust white adjustment at this time.

FOCUS adjustment

- 1) Receive a H-character (INTENSITY-"H") signal.
- 2) Adjust FOCUS control for best overall focus.

[5] COMPOSITE VIDEO CIRCUIT ADJUSTMENT.

CHROMA OSC VECTOR adjustment <NTSC>

- 1) Set INPUT SIGNAL SELECT SWITCH at the "VIDEO" position.
- 2) Receive a NTSC color bar signal through "VIDEO IN" terminal.
- 3) Set TINT control and COLOR control on the rear panel to mid-position.
- 4) Short circuit the test points TP41 and TP42 with a short lead wire.
- 5) Connect a 270 k Ω resistor (composition 1/4W) across TP43 and TP44.
- 6) Adjust VR631 on PCB MAIN for almost color synchronization.
- 7) Remove the short lead and 270 k Ω resistor.
- 8) Set the oscilloscope to the X-Y mode. Connect the PCB-MAIN pin terminals TP46 (B-Y OUT) and TP45 (R-Y OUT) to the oscilloscope horizontal and vertical inputs respectively to display a vector pattern on the screen.
- 9) Adjust L601 so that a R-Y vector (Y-mode) becomes 105°.

CHROMA, OSC, VECTOR adjustment.

<PAL>

- 1) Set INPUT SIGNAL SELECT SWITCH at the "VIDEO" position.
- 2) Receive a PAL color bar signal through "VIDEO IN" terminal.
- 3) Set TINT control and COLOR control on the rear panel to mid-position.
- 4) Short circuit the test points TP41 and TP42 with short lead wire.
- 5) Connect 270 k Ω resistor (composition 1/4W) across TP43 and TP44.
- 6) Adjust VR631 for optimum color saturation.
- 7) Remove the short lead and 270 k Ω resistor.
Receive a PAL G-card signal.
- 8) Set the oscilloscope to the X-Y mode. Connect TP46 (B-Y OUT) and TP45 (R-Y OUT) to the oscilloscope horizontal and vertical inputs respectively to display a vector pattern on the screen. (Fig. 6)
- 9) Adjust COLOR control on the rear panel so that Y axis becomes 3.0Vp-p.

- 10) Observing the outermost dots which correspond to normal color bar, adjust the SCB-COLOR control VR601 and L633 on PCB-MAIN alternately to almost coincide the double dot pattern equally for all color points on the scope.
- 11) Observing around the center dots, adjust the coil L601 on PCB-MAIN so that the movable points on X axis or Y axis may come up to the nearest points of the center bright dot.
- 12) Repeat step 10) and 11) above so that the outer and center dots are converged.
- 13) Detune L601 so that the movable dots may be shifted and distinguished from the center bright point. (Fig. 6)
- 14) Observing the movable dots, AÁ an BB, adjust SUB-COLOR control VR601 on PCB-MAIN so that the double dots shifted in step 13) may come up to the nearest points of X or Y axis, (Fig. 6).
- 15) Adjust L633 slightly so that the outermost dots are converged again.
- 16) If the color of both sides are prominent slightly adjust the coil L601 so that the color of both sides is less on the average.

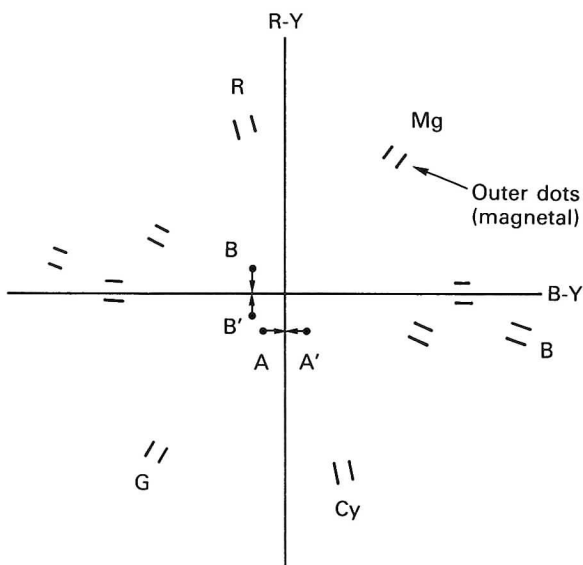


Fig. 6 Vector Pattern of G-card Signal

COMPOSITE BEAM CURRENT adjustment

- 1) Set INPUT SIGNAL SELECT SWITCH at the "VIDEO" position.
- 2) Receive a PAL or NTSC a monochrome signal through "VIDEO IN" terminal.
- 3) Set BRIGHT-control at click stop position, CONTRAST-control at maximum position, SUB-CONT control VR202 to mid-position.
- 4) Adjust SUB-BRT control VR201 on PCB MAIN for optimum brightness.
- 5) Connect a DC ammeter (class 0.5 1 mA range) between the testpoint TP1pin (+) and TP2pin (-).
Adjust SUB-CONT control VR202 for beam current of $500^{+30}_{-0} \mu A$ on the meter.

CHROMA adjustment (composite signal NTSC/PAL)

- 1) Receive a color bar signal.
- 2) Adjust COLOR-control on the rear panel for position.

[6] PURITY AND CONVERGENCE

Procedure

- 1) Remove the deflection yoke and the rubber wedges from the picture tube cone taking care not to strike or scratch the cone.
- 2) Clean the cement remaining on the deflection yoke and the surface of the picture tube cone.
- 3) Receive a full white raster.
- 4) Fit the deflection yoke on the neck of picture tube and push forward.
- 5) Fit C.P. (Magnet) Assembly to the neck of the picture tube and fasten with the screw at the position where the distance between 6-pole magnet end and the base of picture tube is as shown in Fig. 7.
- 6) Demagnetise at the front and sides of the picture tube with a degaussing coil.

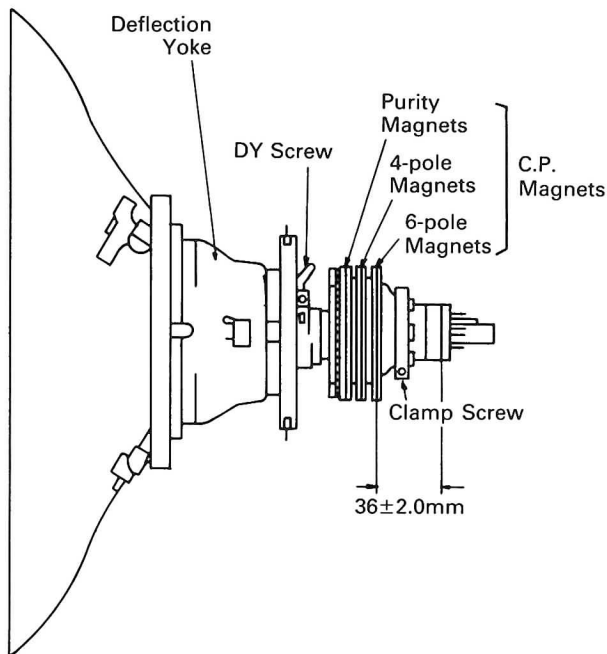


Fig. 7

Preliminary Adjustment

1 Purity

- 1) Short-circuit the base and emitter of R-BLK transistor Q6R0 and B-BLK transistor Q6B0 on PCB-MAIN to produce green raster.
- 2) With the deflection yoke positioned fully forward, adjust purity magnet so that the green ball is at the center of the screen. (Fig. 8)
- 3) Slide the deflection yoke slowly backwards to produce a uniform green raster.
- 4) Remove the shorting link.
- 5) Short-circuit the base and emitter of corresponding two transistors on PCB-MAIN as indicated in Table 1 to produce green, red, and blue rasters and to verify their purity, and fasten the DY screw on the deflection yoke temporarily.
- 6) Remove the shorting leads from respective transistors.

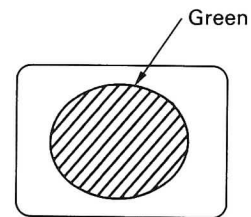


Fig. 8 Screen

Table 1 Transistors to be Short Base to Emitter to Produce Primary Color.

Transistor Raster	R-BLK Q6R0	G-BLK Q6G0	B-BLK Q6B0
Red	Open	Short	Short
Green	Short	Open	Short
Blue	Short	Short	Open

2. Static Convergence

- 1) Set BRIGHT control at click stop position and CONTRAST control at maximum position. (H-SIZE; 250 ± 5 mm, V-SIZE; 180 ± 5 mm, MODE; under scan)
- 2) Adjust two 4-pole magnets to converge red and blue vertical and horizontal lines at the center of the screen.
- 3) Adjust two 6-pole magnets to converge the red and blue lines on green line at the center of the screen.

Note: 1. Adjustment of 4-pole magnets affects red blue beams.
2. Adjustment of 6-pole magnets affects red and blue beams. (Fig. 9)

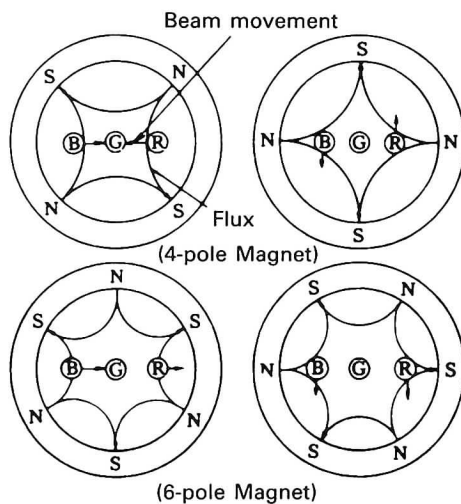


Fig. 9

3. Focus

If necessary, adjust focus. Ascertain that focus is optimum throughout the entire screen. Do not adjust focus after the following adjustments.

Regular Adjustment

1. Purity

- 1) Short-circuit the base and emitter of corresponding two transistor Q6B0 on PCB-MAIN to produce green raster.
- 2) Loosen the deflection yoke screw and move it forwards and check that the green ball is at the screen center. (Fig. 8)
If necessary, adjust purity magnets.
- 3) Slide the yoke backwards to produce a uniform green raster.
- 4) Short-circuit the base and emitter of corresponding two transistors on PCB-MAIN as indi-

cated in Table 1 to produce green, red, and blue rasters and verify their purity, then fasten the DY screw of the deflection yoke temporarily.

- 5) If necessary, repeat steps above.
- 6) Fix the yoke in position using the DY screw.

Note: When adjusting the deflection yoke position, do not touch the purity ring magnets except where necessary.

2. Static Convergence

- 1) Receive a cross-hatch signal.
- 2) BRIGHT control at click stop position and CONTRAST control at maximum position. (H-SIZE; 250 ± 5 mm, V-SIZE; 180 ± 5 mm, MODE; under scan)
- 3) Adjust 4-pole magnets to converge red and blue vertical and horizontal lines at the center of the screen.
- 4) Adjust 6-pole magnets to place the red and blue lines converged on the green lines.
- 5) If necessary, repeat steps 3) and 4) above.

3. Periphery of Convergence

- 1) Apply the magenta crosshatch signal.
- 2) Look at the top and bottom of the screen and face up or down the deflection yoke so that the vertical lines of the two side beams — blue and red — shall be merged (horizontal crossing shall be eliminated).

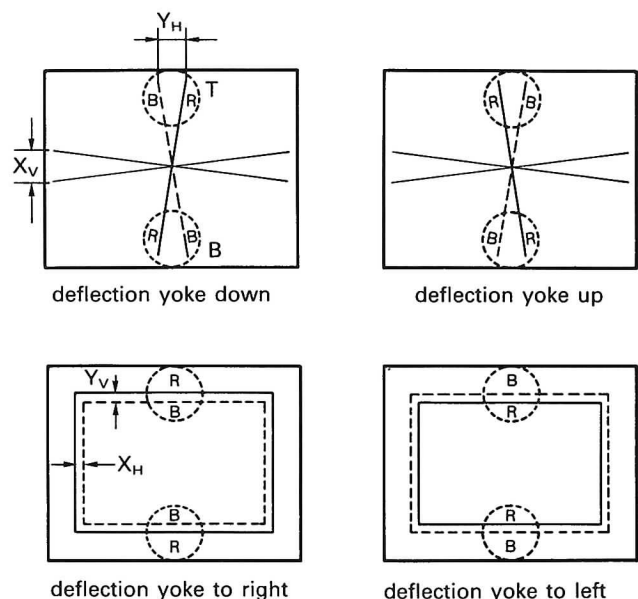


Fig. 10

- 3) Similarly look at the top and bottom of the screen, and face the deflection yoke to right or left so that the horizontal lines of the two side beams shall be merged.
- 4) On completion of the above 2 and 3 adjustment, provisionally secure the wedges.
- 5) X_v is adjustable by turning horizontal bias coil of under the deflection yoke.
- 6) X_H is adjustable by appending a magnet plate.

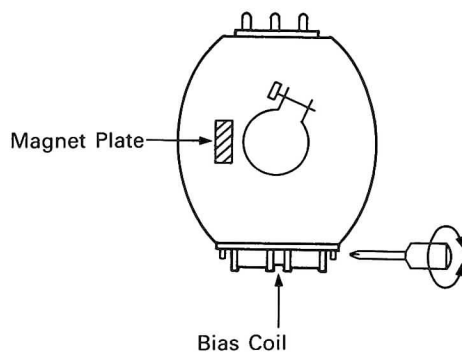


Fig. 11

4. BOW CORRECTION

Carry out the following correction steps only when the blue bow is detected.

- 1) Apply the blue and red crosshatch signal.
- 2) If a blue bow is detected on the X_v , adjust the opening angle of the bow correction 4-pole magnet ring tabs on the deflection yoke according to the intensity of the bow.

Note: Be sure that the bisector of the angle between the tabs shall be in the Y axis, in principle.

The maximum opening angle is 90° (correcting 0.25 to 0.3 mm).

Normally the closed tabs are at the 3 o'clock position.

- 3) Adjust static convergence with the 4-pole magnet of the convergence-purity assembly. Be sure that the blue bow is eliminated. If correction is not enough or excessive, readjust as in the above step 1.

* On completion of adjustment, lock the two rings in position and the two rings to the deflection yoke with locking paint.

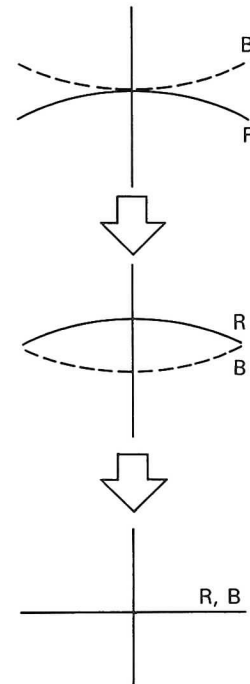


Fig. 12

MEMO

Note: If sync is lost when switching resolutions, adjust FV-35 on the main board to compensate.

PARTS LIST

In order to expedite delivery of replacement part orders.

Specify : 1.Model number/Serial number

2.Part number and Description

3.Quantity

Unless full information is supplied, delay in execution of orders will result.

* Warranty return item

RESISTOR

CAPACITOR

MARK	TOLERANCE	MARK	TOLERANCE	MARK	TOLERANCE
J	± 5 %	J	± 5 %	Z	+ 80 % - 20 %
K	± 10 %	K	± 10 %	C	± 0.25pF
M	± 20 %	M	± 20 %	D	± 0.5pF
N	± 30 %	P	+ 100 % - 0 %	F	± 1pF
				Q	+ 30 % - 10 %

: Critical components

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
ITC				TRANSISTOR			
	255B96001	ITC ASSY	AT14A9ZNB22	Q 201	260P41904	2SC2724-C, D	
				Q 202	260P41904	2SC2724-C, D	
				Q 203	260P41904	2SC2724-C, D	
				Q 204	260P45501	DTC124F (NPN)	
				Q 206	260P45501	DTC124F (NPN)	
INTEGRATED CIRCUIT				Q 207	260P45501	DTC124F (NPN)	
IC290	263P05309	TC4053BP/MC14053		Q 210	260P25601	2SA1115-E, F	
IC2A0	266P01601	LA7016		Q 211	260P58201	2SK656	
IC2A1	266P01601	LA7016		Q 212	260P25601	2SA1115-E, F	
IC2A2	266P98201	AN608P		Q 214	260P41904	2SC2724-C, D	
IC2A3	266P98201	AN608P		Q 290	260P45501	DTC124F (NPN)	
IC2X0	267P01101	STK192		Q 291	260P45501	DTC124F (NPN)	
IC2X1	272P02701	AN5862K		Q 292	260P45501	DTC124F (NPN)	
IC2X2	272P05501	AN5860		Q 293	260P45501	DTC124F (NPN)	
IC401	266P40501	AN5521		Q 294	260P45501	DTC124F (NPN)	
IC5A1	272P22601	TDA4950		Q 2A0	260P45501	DTC124F (NPN)	
IC5X1	267P01301	STR50330		Q 2A1	260P41904	2SC2724-C, D	
IC601	266P15001	TA7698AP		Q 2M0	260P13903	2SA564-Q	
IC6B0	267P01201	VPA05		Q 2M1	260P13903	2SA564-Q	
IC6G0	267P01201	VPA05		Q 2M2	260P13903	2SA564-Q	
IC6R0	267P01201	VPA05		Q 2X0	260P41605	2SC2274-E, F	
IC6X0	272P08101	M51387P		Q 2X1	260P41605	2SC2274-E, F	
IC701	266P09101	SN74LS221N		Q 2X2	260P38701	2SC2236-Q, Y	
IC702	266P84401	SN74LS123N		Q 2X3	260P41605	2SC2274-E, F	
IC703	263P05309	TC4053BP/MC14053		Q 2X4	260P45501	DTC124F (NPN)	
IC704	266P41901	M5223P		Q 2X5	260P41904	2SC2724-C, D	
IC705	266P84401	SN74LS123N		Q 2X6	260P25601	2SA1115-E, F	
IC707	266P41903	M5223L		Q 471	260P41802	2SC2481-Q, Y	
IC709	266P09101	SN74LS221N		Q 571	260P42201	2SC2482	
IC7F1	272P22501	IR9331		Q 572	260P57201	2SD1556	
IC7F2	266P41901	M5223P		Q 573	260P63301	2SK553	
IC7F3	266P41901	M5223P		Q 5A1	260P45501	DTC124F (NPN)	
IC7M1	266P72701	MPC339C/MC3302P		Q 5A3	260P33804	2SC2603-E, F	
IC7M2	266P84201	SN74LS42N		Q 5A5	260P45501	DTC124F (NPN)	
IC7M5	266P85301	SN74LS08N/HD74LS08P		Q 5A6	260P58201	2SK656	
IC7S0	266P47801	SN74LS86N		Q 5X1	260P46901	2SA1321	
IC7S1	266P25601	SN74LS09N		Q 5X2	260P38503	2SC2229-Q, Y	
IC7S2	266P84001	SN74LS00N/HD74LS00P		Q 601	260P33804	2SC2603-E, F	
IC7X0	266P46802	SN74LS157N/HD74LS157		Q 602	260P33804	2SC2603-E, F	
IC901	267P92101	STR59041		Q 680	260P58201	2SK656	
IC961	266P93209	NJM7805A/AN7805/L780					
IC971	272P24001	M5237L					

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
Q 6G0	260P58201	2SK656		D 2X0	264P22001	MZ307B	
Q 6R0	260P58201	2SK656		D 2X1	264P22001	MZ307B	
Q 6X0	260P58201	2SK656		D 2X2	264P22001	MZ307B	
Q 6X1	260P58201	2SK656		D 2X3	264P04504	1S2471	
Q 701	260P25601	2SA1115-E, F		D 2X4	264P04504	1S2471	
Q 702	260P25601	2SA1115-E, F		D 2X5	264P46105	EQA02-06B	
Q 704	260P45501	DTC124F (NPN)		D 2X6	264P04504	1S2471	
Q 705	260P33804	2SC2603-E, F		D 2X7	264P04504	1S2471	
Q 706	260P33804	2SC2603-E, F		D 2X9	264P04504	1S2471	
Q 707	260P45501	DTC124F (NPN)		D 401	264P28501	S5500D	
Q 711	260P33804	2SC2603-E, F		D 501	264P48706	RD12FB	
Q 712	260P33804	2SC2603-E, F		D 502	264P04504	1S2471	
Q 713	260P45501	DTC124F (NPN)		D 503	264P24401	HZT33-01	
Q 715	260P58201	2SK656		D 560	264P28501	S5500D	
Q 716	260P58201	2SK656		D 571	264P53301	RS4FS	
Q 731	260P58201	2SK656		D 572	264P10204	RU-3M	
Q 740	260P33804	2SC2603-E, F		D 573	264P10204	RU-3M	
Q 7M1	260P45501	DTC124F (NPN)		D 574	264P46508	EQA02-13A/RD13EB3	
Q 7M5	260P45501	DTC124F (NPN)		D 575	264P53301	RS4FS	
Q 7M6	260P45501	DTC124F (NPN)		D 5A1	264P04504	1S2471	
Q 7MA	260P45501	DTC124F (NPN)		D 5A2	264P04504	1S2471	
Q 7MB	260P45501	DTC124F (NPN)		D 5A3	264P46508	EQA02-13A/RD13EB3	
Q 7MC	260P45501	DTC124F (NPN)		D 5X1	264P10202	UF-2B/RU-3B	
Q 7MD	260P45501	DTC124F (NPN)		D 5X2	264P29501	ES-1	
Q 7V1	260P33804	2SC2603-E, F		D 5X3	264P29501	ES-1	
Q 7V2	260P33804	2SC2603-E, F		D 5X4	264P46404	EQA02-10B	
Q 901	260P38701	2SC2236-0, Y		D 650	264P23101	TVR1G	
Q 902	260P38701	2SC2236-0, Y		D 651	264P23101	TVR1G	
Q 971	260P46402	2SA940-AB. AC		D 652	264P23101	TVR1G	
				D 656	264P23101	TVR1G	
DIODES				D 691	264P04504	1S2471	
D 201	264P04504	1S2471		D 701	264P04504	1S2471	
D 202	264P04504	1S2471		D 702	264P04504	1S2471	
D 203	264P04504	1S2471		D 703	264P04504	1S2471	
D 204	264P04504	1S2471		D 710	264P04504	1S2471	
D 205	264P04504	1S2471		D 712	264P04504	1S2471	
D 210	264P04504	1S2471		D 713	264P04504	1S2471	
D 211	264P04504	1S2471		D 714	264P04504	1S2471	
D 212	264P04504	1S2471		D 715	264P22006	MZ310B/EQA02-10CDA	
D 213	264P04504	1S2471		D 716	264P46107	EQA02-06D/RD6. 2EB2	
D 214	264P04504	1S2471		D 717	264P04504	1S2471	
D 215	264P04504	1S2471		D 718	264P04504	1S2471	
D 216	264P22003	MZ306/EQA02-06CDA		D 719	264P04504	1S2471	
D 217	264P46006	EQA02-05C		D 720	264P04504	1S2471	
D 220	264P04504	1S2471		D 721	264P04504	1S2471	
D 290	264P22001	MZ307B		D 722	264P04504	1S2471	
D 291	264P22001	MZ307B		D 7F1	264P04504	1S2471	
D 293	264P22001	MZ307B		D 7F2	264P46007	EQA02-05D/RD5. 1EB2	
D 280	264P22001	MZ307B		D 7F3	264P46007	EQA02-05D/RD5. 1EB2	
D 2G0	264P22001	MZ307B		D 7M1	264P04504	1S2471	
D 2R0	264P22001	MZ307B		D 7M2	264P04504	1S2471	
				D 7M3	264P04504	1S2471	
				D 7M4	264P04504	1S2471	
				D 7M5	264P04504	1S2471	
				D 7M6	264P04504	1S2471	

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
D 7M7	264P04504	1S2471	
D 7MA	264P04504	1S2471	
D 7MC	264P04504	1S2471	
D 7MD	264P04504	1S2471	
D 7S0	264P04504	1S2471	
D 7S1	264P04504	1S2471	
D 7S2	264P04504	1S2471	
D 7S3	264P04504	1S2471	
D 7V1	264P04504	1S2471	
D 7V2	264P04504	1S2471	
D 7X0	264P22001	MZ307B	
D 7X1	264P22001	MZ307B	
D 7X2	264P22001	MZ307B	
D 7X3	264P22001	MZ307B	
D 901	264P51201	RBV-40B	
D 902	264P29501	ES-1	
D 903	264P29501	ES-1	
D 904	264P29501	ES-1	
D 905	264P29501	ES-1	
D 906	264P52201	RU-1P	
D 951	264P10204	RU-3M	
D 952	264P10204	RU-3M	
D 953	264P35808	RU-4YX	
D 954	264P35808	RU-4YX	
D 955	264P10202	UF-2B/RU-3B	
D 956	264P10202	UF-2B/RU-3B	
D 991	264P39302	SLC-26GG5	
MISCELLANEOUS			
C 5X5	185D05201	ELECTROLYTIC-C	H180V220 μ F-Q
C 906	185D05301	ELECTROLYTIC-C	H200V470 μ F-M
DL201	337P09601	DELAY LINE	
DL202	337P09901	DELAY LINE	
F 901	283D03805	FUSE	S3. 15A
LC6B1	409P40204	EMI FILTER	
LC6G1	409P40204	EMI FILTER	
LC6R1	409P40204	EMI FILTER	
PC571	268P03301	PHOTO COUPLER	ON3161-R
RP901	265P07104	POSISTOR	PTH451C142BF5ROM140
S 201	129P00709	VR-CH-PRESETTER	SW-BAND
S 290	431C08101	SLIDE SWITCH	
S 291	431C08101	SLIDE SWITCH	
S 292	431C08201	SLIDE SWITCH	
S 293	431C08201	SLIDE SWITCH	
S 571	129P00709	VR-CH-PRESETTER	SW-BAND
T 501	334P15801	FLYBACK TRANS	
T 571	336P00903	H. DRIVE TRANS	
T 5X1	350P39301	POWER TRANS	
T 601	349P15902	CHROME-BP	

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
T 931	350P35003	POWER TRANSFORMER	
X 601	285P01505	CRYSTAL RESONATOR	3. 579545MHZ
	338P01601	CPM ASSY	
	409B06205	DEGAUSSING COIL	
	411D01402	FERRITE CORE	
	432P05303	PUSH SWITCH	
	449C03109	CRT SOCKET	
	451D04601	AC POWER JACK (3P)	
	641D75801	WEDGE	
COILS			
L 290	325C12007	PEAKING COIL	3. 3 μ H-K
L 280	325C12005	PEAKING COIL	2. 2 μ H-M
L 281	325C12005	PEAKING COIL	2. 2 μ H-M
L 2G0	325C12005	PEAKING COIL	2. 2 μ H-M
L 2G1	325C12005	PEAKING COIL	2. 2 μ H-M
L 2R0	325C12005	PEAKING COIL	2. 2 μ H-M
L 2R1	325C12005	PEAKING COIL	2. 2 μ H-M
L 2X0	321C03009	RF COIL	4. 7 μ H-K
L 491	330P12501	DEFLECTION YOKE COIL	
L 501	325C12201	PEAKING COIL	47 μ H-K
L 571	333P01806	H-LIN. COIL	
L 572	409C05401	S-C COIL	
L 573	409C05602	PCC COIL	150 μ H
L 574	409C05501	P-DRIVE COIL	
L 575	409P15203	FILTER COIL	3300 μ H-J
L 5X1	351P03701	FILTER COIL	27 μ H-K
L 5X2	351P03701	FILTER COIL	27 μ H-K
L 601	349P14102	CHROMA CW COIL	
L 650	325C11009	PEAKING COIL	4. 7 μ H-K
L 701	325C12007	PEAKING COIL	3. 3 μ H-K
L 702	321C01002	RF COIL	680 μ H-K
L 901	351P03103	LINE FILTER	
L 952	351P03701	FILTER COIL	
L 953	351P03701	FILTER COIL	
L 954	351P03701	FILTER COIL	
L 955	351P03701	FILTER COIL	
L 956	351P03701	FILTER COIL	
VARIABLE RESISTORS			
VR201	127C08007	VR-SEMI FIXED	1/5W B5K-M
VR202	127C08101	VR-SEMI FIXED	1/5W B50K-M
VR290	129C12701	VR-BLOCK	
VR292	127C08100	VR-SEMI FIXED	1/5W B30K-M
VR293	127C08100	VR-SEMI FIXED	1/5W B30K-M

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
VR294	127C08100	VR-SEMIFIXED	1/5W B30K-M	PRINTED CIRCUIT BOARDS			
VR401	127C08105	VR-SEMIFIXED	1/5W B500K-N	920D12202		POWER PCB ASSY	
VR402	127C08102	VR-SEMIFIXED	1/5W B100K-M	920D07408		DEFL PCB ASSY	
VR5A1	127C18008	VR-SEMIFIXED	1/5W B10K-M	930B29001		MAIN PCB ASSY	
VR5A2	127C18103	VR-SEMIFIXED	1/5W B200K-M	930C23101		SW PCB ASSY	
VR5A3	127C18102	VR-SEMIFIXED	1/5W B100K-M	930C23201		CRT PCB ASSY	
VR5A4	127C18008	VR-SEMIFIXED	1/5W B10K-M	CABINET PARTS			
VR631	127C08007	VR-SEMIFIXED	1/5W B5K-M	242C89301		AC POWER CORD	
VR650	127C03009	VR-SEMIFIXED	1/5W B20K-N	700C08508		BACK COVER ASSY	
VR651	127C03009	VR-SEMIFIXED	1/5W B20K-N	701A37405		FRONT PANEL	
VR652	127C03009	VR-SEMIFIXED	1/5W B20K-N	701A37407		FRONT PANEL	
VR653	127C03101	VR-SEMIFIXED	1/5W B50K-N	761D49401		BUTTON POWER	
VR691	129D11203	VR PCB	0.15W B5K-15S	761D49501		VR KNOB	
VR692	129D11202	VR PCB	0.15W B5K-15S	MECHANICAL PARTS			
VR6B0	127C08009	VR-SEMIFIXED	1/5W B20K-M	669D21201		SCREW	(10P)
VR6G0	127C08009	VR-SEMIFIXED	1/5W B20K-M	669D22104		SCREW	(10P)
VR6X0	127C08008	VR-SEMIFIXED	1/5W B10K-M	669D22108		SCREW	4X25(10P)
VR6X1	127C08008	VR-SEMIFIXED	1/5W B10K-M	PACKING PARTS			
VR701	127C08103	VR-SEMIFIXED	1/10W B200K-N	802C76607		PACKING CASE	
VR702	127C08008	VR-SEMIFIXED	1/5W B10K-M	803B54401		PACKING CUSHION	
VR703	127C08009	VR-SEMIFIXED	1/5W B20K-M	829C04908		PACKING SHEET	
VR761	129D13006	VR-SEMIFIXED	1/4W B300K-M	831B02201		PACKING BAG	
VR771	127C08103	VR-SEMIFIXED	1/5W B200K-M	871C24201		IB MONITOR	
VR7F1	127C08008	VR-SEMIFIXED	1/5W B10K-M	871C34704		SERVICE MANUAL	
VR7F2	127C08006	VR-SEMIFIXED	1/5W B3K-M				
VR7F3	127C08009	VR-SEMIFIXED	1/5W B20K-M				
VR7F4	127C08008	VR-SEMIFIXED	1/5W B10K-M				
VR7F5	127C08007	VR-SEMIFIXED	1/5W B5K-M				
VR901	127C18102	VR-SEMIFIXED	1/5W B100K-M				
RESISTORS							
R 415	103P37804	FUSIBLE RESISTOR	1/4W 2.2-J				
R 510	103P37804	FUSIBLE RESISTOR	1/4W 2.2-J				
R 582	103P39103	FUSIBLE RESISTOR	1/2W 100-J				
R 5AM	103P39800	FUSIBLE RESISTOR	1/2W 1-J				
R 5AN	103P39804	FUSIBLE RESISTOR	1/2W 2.2-J				
R 5XC	102P08209	R-CEMENT WIRE	10W 10-K, J				
R 661	103P43808	R-FUSE METAL	2W 4.7-K, J				
R 7MF	103P54307	RESISTOR(NETWORK)	1/8W 10K-JX4				
R 902	102P08806	R-CEMENT WIRE	7W 2.2-K				
R 906	103P37008	FUSIBLE RESISTOR	1/4W 39-J				